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Attorney Docket No. 450117-03702

New Patent Application filed **December 5, 2001**, entitled:

OPTICAL DISC COPY PREVENTION SYSTEM

corresponding to PCT Application No. PCT/EP01/02633

filed March 8, 2001

Express Mail No.: EV 001579087 US

Date of Deposit: December 5, 2001

I hereby certify that this application is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to:

U.S. Patent and Trademark Office
Box PCT
P.O. Box 2327
Arlington, VA 22202

Charles Jackson

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
53351 Gö/as		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/EP 01/ 02633	08/03/2001	07/04/2000
Applicant		
SONY DADC AUSTRIA AG		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 3

   [X] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

To:
MÜLLER & HOFFMANN
Patentanwälte
Attn. Görz, Ingo
Innere Wiener Strasse 17
D-81667 München
GERMANY

EINGEGANGEN
MÜLLER & HOFFMANN
9. Juli 2001
Frist LT. 10.9.01/m

Date of mailing *(day/month/year)* 10/07/2001	
Applicant's or agent's file reference 53351 Gö/as	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/EP 01/02633	International filing date *(day/month/year)* 08/03/2001
Applicant SONY DADC AUSTRIA AG	

1. [X] The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:
The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Fascimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. [ ] The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. [ ] **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

[ ] the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

[ ] no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Jolanda Offerman-Hazeleger

Form PCT/ISA/220 (July 1998)

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international pbulication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

BNSDOCID: <XSISA220NOENP4_1_>

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped),whether

(i) the claim is unchanged;

(ii) the claim is cancelled;

(iii) the claim is new;

(iv) the claim replaces one or more claims as filed;

(v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."

2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."

3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."

4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international appplication is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide

BNSDOCID: <XSISA220NOENP4_1_>

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

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53351 Gö/as		
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PCT/EP 01/ 02633	08/03/2001	07/04/2000
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SONY DADC AUSTRIA AG		

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   [X] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 01/02633

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G11B20/00 G11B20/14 G06F1/00 G11B20/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G11B G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 005 839 A (OWA HIDEO ET AL) 21 December 1999 (1999-12-21) cited in the application column 1, line 43 - line 46 column 3, line 55 -column 6, line 53 column 9, line 8 -column 10, line 9	1-4,8, 11-14, 18-22
A	WO 98 08180 A (T T R TECHNOLOGIES LTD) 26 February 1998 (1998-02-26) the whole document	1-4,8, 11-14, 18-22
A	WO 00 67095 A (TRYMEDIA SYSTEMS) 9 November 2000 (2000-11-09)	

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 June 2001	10/07/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Ogor, M

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/EP 01/02633

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6005839 A	21-12-1999	JP 9115242 A	02-05-1997
WO 9808180 A	26-02-1998	AU 3706197 A	06-03-1998
		EP 1076902 A	21-02-2001
WO 0067095 A	09-11-2000	AU 4499900 A	17-11-2000

Description

Optical Disc Copy Prevention System

The present invention relates to a copy protection method for record carriers, i.e. storage media, which store digital data as an asynchronous signal, e.g. Compact Discs (CDs) and Digital Versatile Discs (DVDs) including all existing or future formats of CD and DVD or other Optical Storage Media which work according to a similar concept.

In particular, the copy protection method according to the present invention prevents of the ability to make a physical copy or creating a complete data image of the media content.

Optical storage discs with information stored on one or both sides have come to be used for a variety of purposes, most notably in the music, games, video and computer industry. Digital information is stored on the optical storage media in the form of pits arranged along circular, concentric tracks on one or on both sides of the disc. The track is typically read from the inside out, but may also be read form outside in, as it is already used for some optical storage media.

The data itself on the track is subdivided into frames, each equal in length, containing equal amounts of information. Each frame has a dedicated layout depending on the type of optical storage media (CD, DVD). Such a frame always contains the user data symbols itself but also data for synchronization, merging data between data symbols and error correction.

The signal on a optical storage medium itself is asynchronous, which means that in the decoding process synchronization and timing information has to be spied out from the signal.

Due to the nature of such storage media copies can be made easily. To cope with this situation, there exist various copy protection schemes which try to prevent unauthorized access with the help of keys or passwords stored on the respective storage medium itself. Further, there exist methods which secure an optical disc with the help of stored invalid information which gets repaired during the copy process so that an application program can determine whether it is stored on an original or

on a copy based on the presence or absence of this invalid information.

However, theses copy protection schemes only prevent the copying in an indirect way, i.e. copying is possible and only the access of a copied record carrier might be restricted.

Further, US 6,005,839 describes a copy protection scheme for optical record carriers, in particular DVDs, according to which direct or dump copying is prohibited by inserting a synchronization pattern at an irregular position different from the regular position or by inserting a synchronization pattern different to the standard synchronization pattern at the regular position of certain areas or sectors of the optical record carrier. To assure an undisturbed reproduction of such a record carrier the reproducing obstructing area created with the misleading synchronization patterns is skipped by jumping based on position designating information (designating the reproducing obstructing area) which is recorded on the record carrier, preferrably in the Table Of Contents (TOC) area.

Therefore, it is an object underlying the present invention to provide an improved copy protection method, i.e. a method to produce a record carrier which comprises an improved copy protection, a record carrier with an improved copy protection, and a record carrier writing device which can produce such record carriers.

The method according to the present invention is defined in independent claim 1, a record carrier with a copy protection according to the present invention is defined in independent claim 11, and a record carrier writing device which can produce such record carriers is defined in independent claim 20. Preferred embodiments thereof are respectively defined in the claims dependent thereon. In particular, claims 9 and 10 define a computer program working according to the inventive method.

The central feature of the present invention is to write additionally generated data to at least one specific portion of the record carrier so that a general purpose reading device which can access record carriers of different formats which accesses said record carrier judges said record carrier to be unaccessable and that a record carrier according to the present invention comprises at least one specific portion with such additionally generated data.

Therewith, according to the present invention such additionally generated data which confuses a reading device is inserted in such areas which are not accessed by a reading device designed for that type of record carriers, e.g a normal audio CD player for audio CDs, but which are always accessed by a general purpose reading device, e.g. a CDROM reading device.

The additionally generated data is generated and stored additionally to the data intended to be recorded and the data needed for accessing the data intended to be recorded.

The term 'write ... to at least one specific portion of the record carrier' is not restricting the scope to a direct writing to the record carrier, e.g. to a CDR (CD recordable), but also includes the writing to a master from which record carriers are replicated.

Record carriers of different formats are not only different types of record carriers, e.g. CDs and DVDs, but also one type of record carriers which can record multiple sessions of the same or different types.

A session in this sense means a data stream recorded without interruption with a lead-in portion at the beginning, a lead-out portion at the end, and eventually a middle area in-between different parts of the data stream.

According to the present invention said data generation comprises the step of generating at least one special pattern which is decoded so that no clock regeneration of the stored data can be performed by said reading device when accessing the at least one specific portion of the record carrier which stores said special pattern.

In case a reading device tries to access the specific portion comprising the so generated data it is not possible for said reading device to regenerate the clock of the stored data. In this case the general purpose reading device will generate an error message indicating that the inserted record carrier is not accessable.

Alternatively or additionally to achieve such a result said data generation comprises the step of copying a synchronization pattern at least once into

said at least one specific portion of the record carrier at a respective position normally not having a synchronization pattern. In this case the reading device trying to access the specific portion does not find the correct synchronization, since it gets confused by the higher number of synchronization patterns, and the result is the same as in the case described before. Such a copying also includes the simulation of a synchronization pattern by modifying standard data bytes to look like a synchronization pattern.

Therewith, according to the present invention a method is defined how to modify the physical data stream on an optical storage disc to influence the decoding process in a way, that it is impossible to find the exact synchronization and timing. This may lead either to stopping of the decoding process or at least to a wrong decoding of data symbols.

However, according to the present invention this influencing of the decoding process is only performed in case a general purpose reading device which can access record carriers of different formats, i.e. record carriers which can record multiple sessions, tries to access the record carrier provided with the copy protection according to the present invention. Reading devices which are specially designed for a record carrier of a predetermined format, e.g. audio data recorded in one session, can still access a record carrier provided with the copy protection according to the present invention if that patterns are e.g. included in the lead-in portion of the second session. General purpose reading devices which support multiple formats need to at least analyze the lead-in portion of the second session and in this way the decoding process gets confused. Such reading devices which are specially designed for a record carrier of a predetermined format are not limited to new specially adapted reading devices, but all existing reading devices of this type already fullfill the necessary requirements.

This strategy according to the present invention is also applicable to the pregap portion of an audio CD, i.e. the gap portion before the audio content starts.

Alternatively or aditionally to the inserted patterns for misleading the clock regeneration or the synchronization, it is also possible to generate a modified pointer to a further session on a multi session record carrier. Such a pointer to a further session on a multi session record carrier, in the following also referred to as session pointer, is aranged in the lead-in portion of a session and points to the beginning of

the data area of the following session. An appropriate modification of this pointer leads to the wanted confusion of the general purpose reading device. According to the present invention, preferrably a recursive pointer might be defined, further preferrably in the third session, which does not point to the beginning of the data area of the following session, but to the beginning of the data area of the same session. In case a general purpose reading device tries to access the so modified record carrier, it gets confused and judges this record carrier as unaccessable.

Furthermore, it is is an object underlying the present invention to provide a general purpose reading device which can access record carriers provided with the copy protection according to the present invention.

This object is solved by a record carrier accessing device according to independent claim 19 which is switchable or preprogramable to not read at least one predetermined portion of a predetermined type of record carriers to be accessed, namely to not read the at least one specific portion of the record carrier which stores the above described additionally generated data.

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and, together with a general description of the invention given above, and the detailed description of the embodiment given below, serve to explain the principles of the invention, wherein:

Figure 1 illustrates the CD frame format;

Figure 2 shows the decoding process for record carriers which store data in asynchronous streams; and

Figure 3 elucidates the principle of a recursive session pointer according to the present invention.

The following description shows as an example how to modify the physical data stream of an audio CD to prevent correct decoding within a multi session capable reading device, i.e. a general purpose reading device. The format of the physical data stream is specified in the 'Red Book' specification and IEC 908.

The physical data stream on a CD is optimized in multiple ways to reduce errors and guarantee a simple decoding mechanism. Therefore every 3 to 11 bits must be a transition of the signal. Within the data symbols this is guaranteed by the EFM

(Eight to Fourteen Modulation). The audio data is split into 8 bit symbols which are converted to a 14 bit symbol with the EFM table. This table consist of 256 entries of 14 bit values which are combinations of bits which contain more than 2 but less than 10 zeros continuously. Every '1' in the 14 bit symbol represents a transition of the signal. To also guarantee this restriction when symbols are concatenated there are additional 3 bits of merging, which must be chosen accordingly. The resulting signal between two transitions are called pits and lands. The length of each is bounded between 3 and 11 times the base length.

The final frame of audio data contains the following data:

1 synchronization symbol	24 bits
1 subcode byte	14 bits (EFM encoded)
24 data bytes	336 bits (EFM encoded)
8 parity bytes	112 bits (EFM encoded)
34*3 merging bits	102 bits
TOTAL	588 bits

The bits are composed is the way as shown in figure 1. The order of one CD frame is as follows: the synchronization pattern of 24 bits is followed by 3 auxiliary bits for merging and low frequency suppression; thereafter 14 bits subcode data are followed by 3 auxiliary bits for merging and low frequency suppression; thereafter 12 blocks of 14 bits information data are respectively followed by 3 auxiliary bits for merging and low frequency suppression; thereafter 4 blocks of 14 bits parity data are respectively followed by 3 auxiliary bits for merging and low frequency suppression; thereafter 12 blocks of 14 bits information data are respectively followed by 3 auxiliary bits for merging and low frequency suppression; and finally 4 blocks of 14 bits parity data are respectively followed by 3 auxiliary bits for merging and low frequency suppression.

Figure 2 illustrates the decoding process, which can be influenced according to the present invention by confusing either the clock regeneration or the synchronization detection and timing.

The input signal to the decoder read out from the disc undergoes a bit detection 1 followed by a demodulation 2 with following error correction 3 and channel demul-

tiplexing 4. The output signal from the bit detector 1 is input to a clock regeneration circuit 5 and also to a synchronization detection and timing circuit 6 which additionally receives the output signal of the clock regeneration circuit 5. The synchronization detection and timing circuit 6 supplies its output signal to the channel demultiplexer 4 which outputs a first signal to a D/A converter and lowpass filter 7 to generate the first channel ch1 of audio output and a second signal to a D/A converter and lowpass filter 8 to generate the second channel ch2 of audio output. The output signal from the demodulator 2 is additionally input to a control and display decoding unit 9 which supplies a control functions means 10 and a display 11 with input signals.

Confusing clock regeneration:
Normally data symbols vary in the data signal, so each pit length should be available within some frames. Each CD drive uses special patterns for retrieving clocking information out of the signal, if this pattern is not available the CD drive is not able to continue decoding. Usage of certain patterns for user data allows to remove patterns which a CD drive needs for clock regeneration and so prevents to decode data correctly.

Confusing synchronization and timing:
The synchronization symbol is the bit sequence '10000000000100000000010' which include 3 transitions of the signal. Normally the merging algorithm has to be selected in a way to avoid that this signal occurs within the data symbols. Searching the data stream for this signal makes it possible for the decoder to find the start of a CD frame. Usage of certain patterns for user data and modifying the merging algorithm allows to have the synchronization symbol multiple times within a frame which so prevents that the CD drive finds the correct synchronization symbol (start of frame) and furthermore prevents to decode data correctly.

Figure 3 elucidates the principle of session pointers, i.e. pointers arranged in the lead-in portion of a session pointing to the beginning of the data area of the respectively directly following session which is modified according to a preferred embodiment of the present invention in that one of these session pointers, here the session pointer normally pointing from the lead-in portion of the third session to the beginning of the data area of the fourth session, is a recursive pointer and points to the beginning of the data area of the session in which it itself is arranged, here to the beginning of the data area of the third session. This principle is elucidated for an

audio CD modified according to the present invention which comprises at least three sessions, each of which has a lead-in portion, a data area, and a lead-out portion.

According to the present invention, both methods of confusing decoding can be used for copy prevention independently or together because the decoding gets out of order. Further, also the arrangement of a recursive session pointer might be used alone or together with the confusing decoding according to the present invention. An intelligent placement of regions where the signal is modified for copy prevention allows to keep ability of playback of user data with a reading device specially adapted to the recorded user data, e.g. to audio data recorded on audio CDs, but prevents of making a copy.

Similar modifications can be done for DVD, which uses similar layout of the signal and for the decoding process.

Claims

1. Method to produce a record carrier which stores data as an asynchronous signal, **characterized by** the followind step:

- writing additionally generated data to at least one specific portion of the record carrier so that a general purpose reading device which can access record carriers of different formats which accesses said record carrier judges said record carrier to be unaccessable.

2. Method according to claim 1, **characterized in that** said data generation comprises the step of generating at least one special pattern which is decoded so that no clock regeneration of the stored data can be performed by said reading device when accessing the at least one specific portion of the record carrier which stores said special pattern.

3. Method according to claim 1 or 2, **characterized in that** said data generation comprises the step of copying a synchronization pattern at least once into said at least one specific portion of the record carrier at a respective position normally not having a synchronization pattern.

4. Method according according to anyone of the preceding claims, **characterized in that** said generated data is arranged to be written to a lead-in portion and/or a middle area and/or a lead-out portion of a session recorded on the record carrier.

5. Method according according to anyone of the preceding claims, **characterized in that** said additionally generated data comprises a modified session pointer.

6. Method according to claim 5, **characterized in that** said modified session pointer is a recursive session pointer.

7. Method according to claim 5 or 6, **characterized in that** said modified session pointer is arranged in the third session

8. Method according according to anyone of the preceding claims, **characterized in that** said record carrier is a CD or DVD.

9. Computer program having program code means to perform all steps according to anyone of claims 1 to 8, if the program is run on a computer.

10. Computer program having program code means according to claim 9 being stored on a computer accessable storage means.

11. Record carrier which stores data as an asynchronous signal, **characterized by** additionally generated data within at least one specific portion of the record carrier so that a general purpose reading device which can access record carriers of different formats which accesses said record carrier judges said record carrier to be unaccessable.

12. Record carrier according to claim 11, **characterized in that** said additionally generated data comprises at least one special pattern which is decoded so that no clock regeneration of the stored data can be performed by said reading device when accessing the at least one specific portion of the record carrier which stores said special pattern.

13. Record carrier according to claim 11 or 12, **characterized in that** said additionally generated data comprises at least one synchronization pattern at a respective position normally not having a synchronization pattern.

14. Record carrier according according to anyone of claims 11 to 13, **characterized in that** said generated data is arranged within a lead-in portion and/or a middle area and/or a lead-out portion of a session recorded on the record carrier.

15. Record carrier according according to anyone of claims 11 to 14, **characterized in that** said additionally generated data comprises a modified session pointer.

16. Record carrier according to claim 15, **characterized in that** said modified session pointer is a recursive session pointer.

17. Record carrier according to claim 15 or 16, **characterized in that** said modified session pointer is arranged in the third session.

18. Record carrier according according to anyone of claims 11 to 17, **characterized in that** said record carrier is a CD or DVD.

19. Record carrier accessing device, **characterized in that it** is switchable or preprogramable to not read at least one predetermined portion of a predetermined type of record carriers to be accessed.

20. Record carrier writing device for writing record carrieres which store data as an asynchronous signal, **characterized by** being able to write additionally generated data to at least one specific portion of the record carrier so that a general purpose reading device which can access record carriers of different formats which accesses said record carrier judges said record carrier to be unaccessable.

21. Record carrier writing device according to claim 20, **characterized by** being able to write patterns to said at least one specific portion of the record carrier so that for a reading device no clock regeneration of the stored data can be performed when accessing said at least one specific portion of said record carrier.

22. Record carrier writing device according to claim 20 or 21, **characterized by** being able to write synchronization patterns to said at least one specific portion of the record carrier outside areas which are defined for synchronization patterns.

23. Record carrier writing device according to anyone of claims 20 to 22, **characterized by** being able to write a modified session pointer.

24. Record carrier writing device according to of claim 23, **characterized by** being able to write a recursive session pointer.

25. Record carrier writing device according to of claim 23 or 24, **characterized by** being able to write said modified session pointer in the third session.

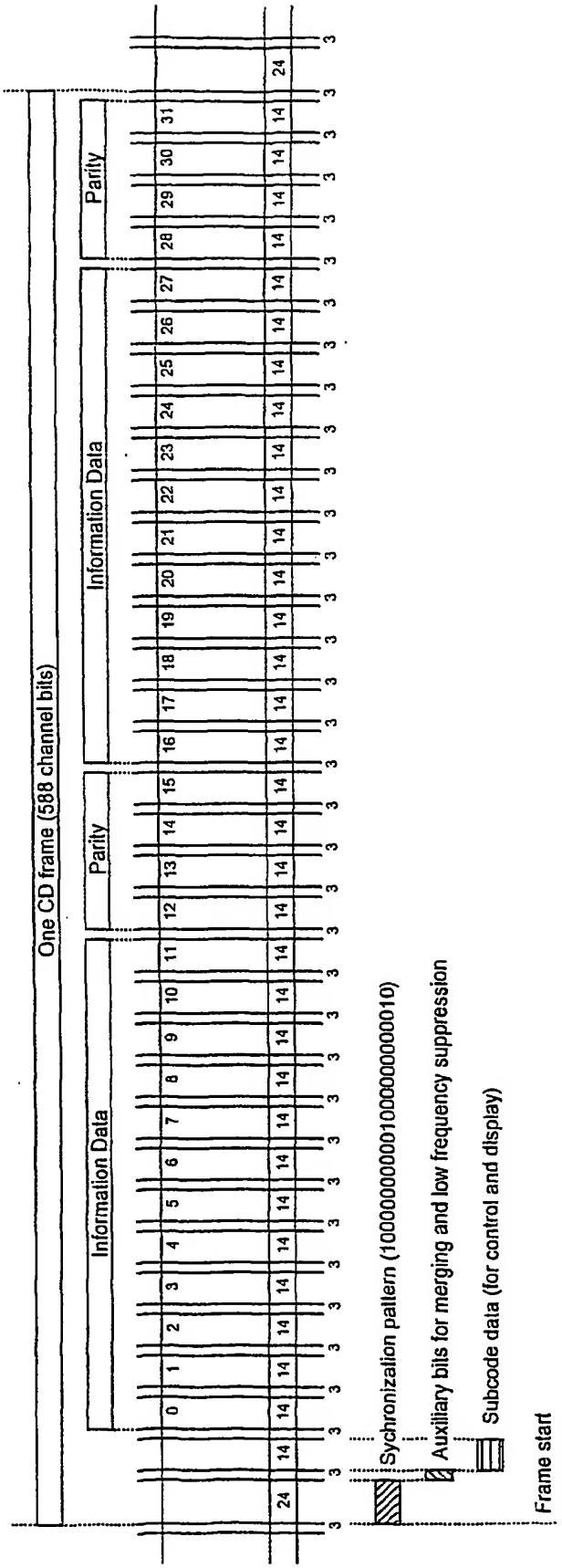

Figure 1: CD frame format

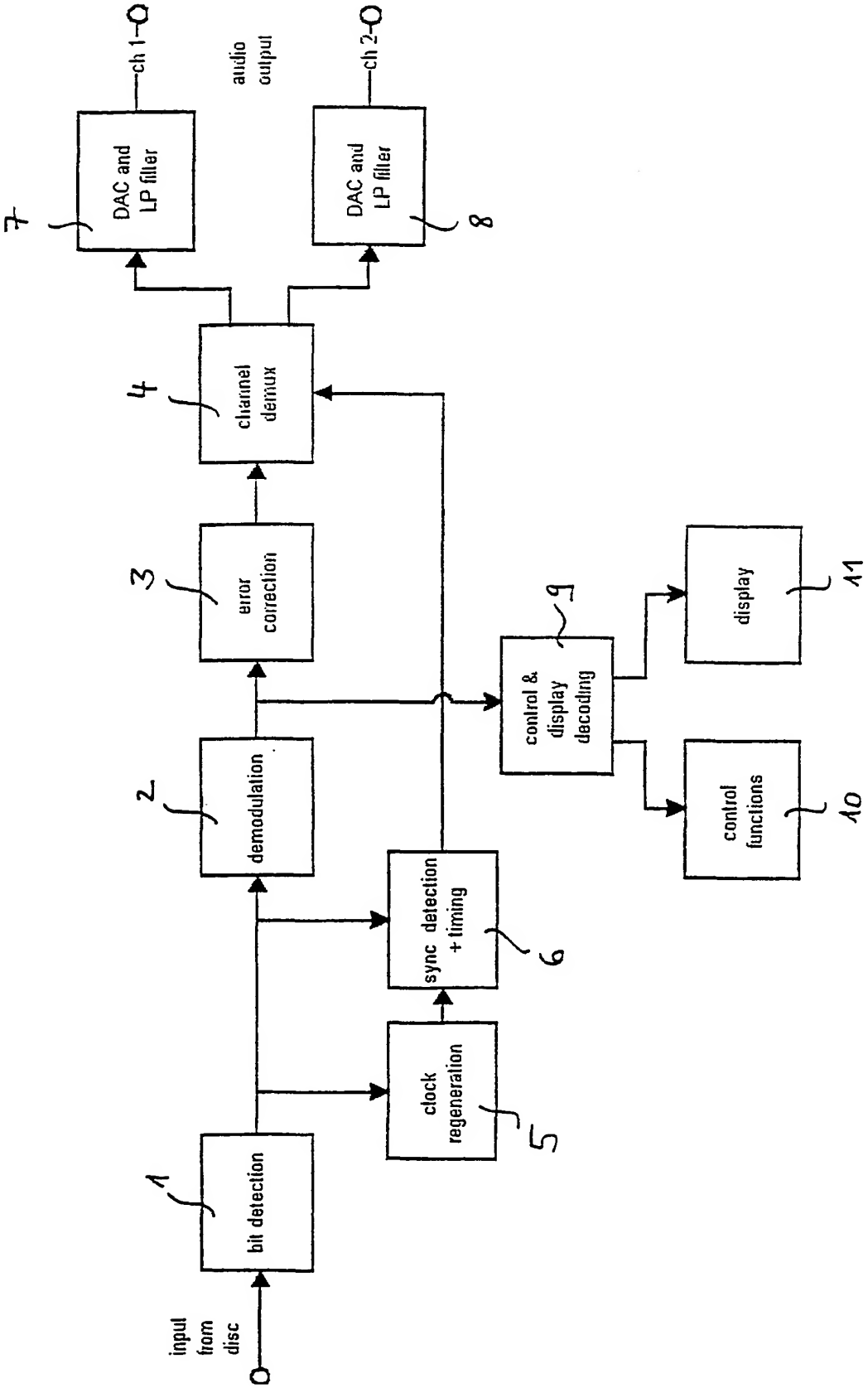

Figure 2: Decoding process

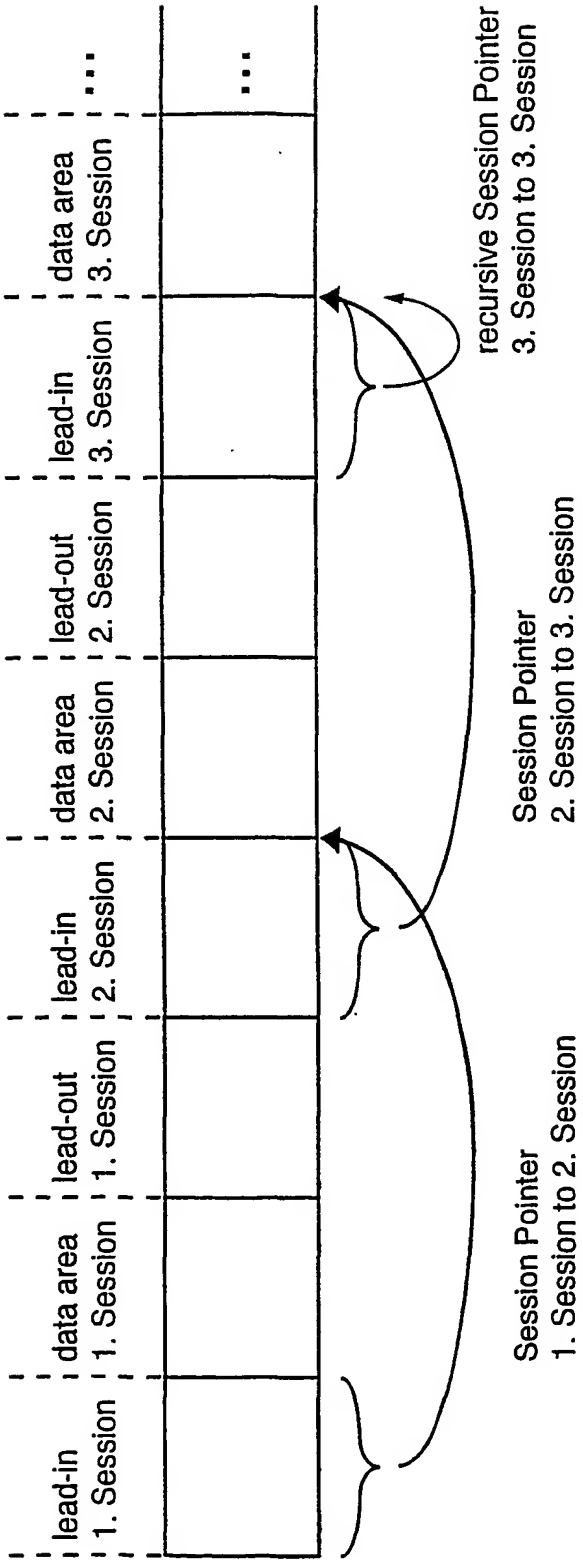
lead-in
1. Session
data area
1. Session
lead-out
1. Session
lead-in
2. Session
data area
2. Session
lead-out
2. Session
lead-in
3. Session
data area
3. Session
...
...
Session Pointer
1. Session to 2. Session
Session Pointer
2. Session to 3. Session
recursive Session Pointer
3. Session to 3. Session

Fig. 3